

A Comparison of the Influence of Debtload on the Persistence of Students at Public and Private Colleges

By James Cofer and
Patricia Somers

James Cofer is Vice President for Finance and Administration in the University of Missouri System. Patricia Somers is Associate Professor of Higher Education at the University of Missouri - St. Louis.

This study used the National Postsecondary Student Aid Survey (NPSAS:87 and NPSAS:93) to examine how debtload influences undergraduate persistence decisions at both public and private colleges. Tuition prices continued to have a significant negative effect on persistence; however, that effect decreased from 1987 to 1993 in all cases. At every level, private school students were more sensitive to the effects of debtload than public school students. This finding was especially significant in the 1993 model.

The student financial aid community continues to speculate about the impact of debtload on student decisions, commonly assuming that high debt burden influences student choices, including whether to persist in college. However, there is limited research on the role debtload plays in student decision making; much of the research agenda has been based on priorities generated by Congress (Somers & Bateman, 1997). During the 1990s, increasing concern over default rates generated interest on the part of the General Accounting Office and academic researchers in using data analysis to reduce the numbers of students who default. Policymakers have focused on cost, through federal and state college affordability studies. Recent concern over balancing the federal budget has shifted the discussion to the need and funding levels for loans, and away from the impact loans have on students. Attention has most recently centered on increasing the level of Federal Pell Grants. All of these issues have shifted focus away from research on student debtload.

This study is part of a stream of research since 1992 that explores the impact of student loans and used the National Postsecondary Student Aid Study (NPSAS:87 and NPSAS:93) to examine how debtload influences undergraduate student decisions at both public and private colleges.

Three Eras of Literature on Debtload

The higher education literature on student debtload can be classified into three eras. The early literature (Harney, 1966; Horch, 1978) focused on general concern over student loans, but was inconclusive in terms of impact.

The second era, using data from the 1980s, reflected the growing concern over the consequences of shifting from grants to loans and the increased debt burden for graduate and professional school students (Brotherton, 1995; Chambers, 1992;

Dial, 1987; Kassebaum, 1996; Petersdorf, 1991; Zarkowski, 1995). Other studies showed that although total debtload was rising, students could repay their debt after graduation and the debt had little influence on post-baccalaureate decisions (Decision Resources Corporation & Westat, 1992; Pedalino, Chopick, Saunders, & McHugh, 1992). A study of 1990 graduates found that "Consistent with previous research and contrary to popular opinion, the vast majority of college graduates who borrow are not experiencing excessive debt burden. In fact, fewer than half of the 1990 college graduates were in debt less than one year after graduation" (Westat, 1993, p. 29).

The literature of the third era, using data from 1992 and later, sounded the alarm over the size of student debtload. Greiner (1996) found that 26% of the students surveyed (Iowa student loan recipients) had unmanageable debt, based on an income-to-student-loan-repayment ratio. This compared to 6.5% in 1986 (Decision Resources Corporation & Westat, 1992) and 8.3% in 1990 (Westat, 1993). Both of these studies used national samples.

Cofer and Somers (1997, 1999), using NPSAS:93, found that accumulated debtload was negatively associated with within-year persistence of all four-year, undergraduate students. In addition, they concluded that the threshold method of representing debtload rather than average debtload was more applicable to persistence studies using debt as a variable. Their analysis suggested that debt thresholds more accurately reflected the decision-making process of students facing persistence/departure decisions.

The Historical Moment

Data for the current study were gathered during a transitional period in student aid funding, which witnessed the shift in federal financial aid policy from grants to loans. The watershed event in federal student financial aid, the Higher Education Act of 1965 (HEA), 20 U.S.C. § 1001 *et seq.*, provided aid directly to students, rather than to institutions, legislating Educational Opportunity Grants (EOGs) for the poorest students and subsidized loans for lower-middle class students. During the 1970s, 76% of federal student financial aid was in the form of grants and 20% in loans. By the mid-1980s, that ratio had almost reversed, with loans accounting for 67% and grants 29% of federal financial aid (Hannah, 1996). Further, Federal Pell Grants paid less than 50% of the cost of education (College Board, 1992).

The 1986 HEA reauthorization did little to change the nature of a federal financial aid policy focused on loans. Loan limits were increased so that freshmen and sophomores could borrow up to \$2,650 annually, and upperclassmen could borrow \$4,000. These amounts were increased from a pre-1986 level of \$2,500. The aggregate loan amount for undergraduates was raised from \$17,500 to \$25,000. The cumulative amount that a

student could borrow for both undergraduate and graduate school was \$54,750, more than twice the previous limit of \$25,000 (Gladieux & Wolanin, 1976).

In 1993, when the second data set for our study was collected, loans had long replaced grants as the "subsidy of choice" in federal financial aid policy. The acceptance of debt as a method of financing a college education was now firmly entrenched, out of necessity rather than choice. Attitudes toward loans, amounts of subsidies, and net cost of college attendance all changed in the intervening years between NPSAS:87 and NPSAS:93.

Theoretical Framework

The framework for this study is drawn from sociology and economics. Sociological theory (Alexander & Eckland, 1975; Blau & Duncan, 1967; Eckland & Alexander, 1980; Parsons, 1959; Thomas, Alexander, & Eckland, 1979; Sewell & Shah, 1967; Sewell & Hauser, 1975; Trent & Medskar, 1968; Wolfle, 1985) suggests that background, family, academic ability, and aspiration variables should be included in any research on student attainment. From economic theory (Becker, 1964; Denison, 1964; McPherson, 1982; Rusbult, 1980; Schultz, 1960) comes the notion that students invest in their education. Student aid and demand studies (Corrazzini, Dugan, & Grabowski, 1972; Hoenack & Weiler, 1977; Hopkins, 1974; Stafford, Lindstedt, & Lynn, 1984; Tannen, 1978) indicate that students "purchase" more education when prices are lower and less when prices are higher. Subsidies, in the form of student financial aid, lower the net cost of attendance. The research cited in the literature review generally used models that integrated these theories, as represented by background, price, and college experience variables.

Method

Research Questions

This study used the following questions to guide the research:

- How do background, achievement, college experience, and price influence within-year undergraduate persistence at public versus private colleges?
- How has the influence of debtload on persistence changed between 1987 and 1993?
- What implications do the results have for policymakers?

Model Specifications

Our model (Table 1) draws on previous NPSAS research (Andrieu, 1991; Andrieu & St. John, 1993; St. John, 1991a, 1992, 1994; St. John & Andrieu, 1995; St. John et al., 1992; St. John & Starkey, 1995a, 1995b; Starkey, 1993; Trammell, 1994). We focused exclusively on within-year progression of students from the fall to the spring semesters. In addition to including the variables consistent with prior studies, the amount of debt was added to the model as three separate thresholds of debt, consis-

*Private school
tuition increased
87%, and public
school tuition
increased 128%
between 1987
and 1993.*

tent with prior research that included debt in persistence models (Cofer & Somers, 1997, 1999; DeAngelis, 1998).

We were careful to select the same variables from NPSAS:87 and NPSAS:93. In some instances, variables that we would liked to include in the analysis were not present in both data sets. In those cases, variables were excluded from both models. The model consisted of the factors background, aspirations and achievement, college experiences, price/subsidy, and debt. The variables are described in Table 1.

Sample

This study used the National Postsecondary Student Aid Survey of 1986-87 (NPSAS:87) and 1992-93 (NPSAS:93) to explore how debtload and other variables affect within-year undergraduate persistence at public and private colleges, and to study how the effect of debtload changed over the period.

The NPSAS:93 and NPSAS:87 databases were adjusted in three phases to arrive at the study sample. The first phase eliminated all two-year college students and graduate students. The second phase eliminated all records that indicated a "missing value" for the "total amount borrowed" variable. Finally, to adjust for the oversampling of seniors in NPSAS:93 and arrive at a more uniform distribution by class level, a random sample was taken of approximately 50% of the seniors who remained after the first two phases. These adjustments yielded a total sample of 21,448 students from NPSAS:87 (10,230 private and 11,218 public college students), and 16,782 students from NPSAS:93 (5,557 private and 11,225 public college students).

The descriptive statistics for the total sample (and private school and public school students) for NPSAS:87 and NPSAS:93 are shown in Table 2. Private school students were clearly a much more diverse group in 1992-93 than they were in 1986-87, based on ethnicity, gender, and age. The dispersion by income level showed a marked difference between the two surveys. How much of that difference was attributable to the change in defining a "dependent" student in federal student aid calculations is not known. In the background statistics, it is interesting to note the reduction in the number of mothers with an undergraduate college degree. However, a review of the data indicated that a greater number of mothers had advanced degrees in 1993 than in 1987.

Prices showed the most dramatic change of any of the variables in both models. Private school tuition increased 87% (from \$5,703 to \$10,671), and public school tuition increased 128% (from \$1,376 to \$3,143) between 1987 and 1993. Financial aid and accumulated debt variables all increased between the two surveys, but not at the rate of increase in tuition. In conjunction with the absolute level of accumulated debt rising, more students borrowed and more students had higher levels of debt. Those students with high debt (more than \$7,000)

TABLE 1
Variables Included in the Model

Variables/Factors	Variable Name	Coding
Background		
Ethnicity	African-American	0=no, 1=yes
Ethnicity	Hispanic	0=no, 1=yes
Ethnicity	Other	0=no, 1=yes
Gender	Gender	1=Male 0=Female
Age	Under 22	0=no, 1=yes
Age	Over 30	0=no, 1=yes
Income	Low income: family income less than \$11,000	0=no, 1=yes
Income	Middle income: family income more than \$11,000 but less than \$60,000	0=no, 1=yes
Income	High income: family income greater than \$60,000	0=no, 1=yes
Marital status	Married	0=no, 1=yes
Mother's educational achievement	College degree	0=no, 1=yes
Father's educational achievement	College degree	0=no, 1=yes
Employment	Working full-time	0=no, 1=yes
Disability	Have any disability	0=no, 1=yes
Financially independent	Independent for financial aid purposes	0=no, 1=yes
Aspirations		
Aspirations	Expect to complete some college	0=no, 1=yes
Aspirations	College degree expected	0=no, 1=yes
Aspirations	Advanced degree expected	0=no, 1=yes
High school experience		
High school degree	No high school degree	0=no, 1=yes
High school degree	GED or certificate	0=no, 1=yes

(Continued on following page.)

TABLE 1
Variables Included in the Model (cont.)

Variables/Factors	Variable Name	Coding
College experience		
Institution	Doctoral	0=no, 1=yes
Institution	Public	0=no, 1=yes
GPA	High GPA More than 3.50 GPA	0=no, 1=yes
GPA	Low GPA Less than 2.00 GPA	0=no, 1=yes
Class	Sophomore	0=no, 1=yes
Class	Junior	0=no, 1=yes
Class	Senior	0=no, 1=yes
Resident	Live on campus	0=no, 1=yes
Work	Work full-time: more than 35 hours per week	0=no, 1=yes
Remediation	Did the student receive remedial instruction?	0=no, 1=yes
Attendance pattern	Full-time	0=no, 1=yes
Price		
Tuition and fees	Tuition and fees normally charged for full-time, full year enrollment	Actual amount divided by 1000
Grants	Total grants and scholar- ships: current year	Actual amount divided by 1000
Loans	Total loans including Federal PLUS loans: current year	Actual amount divided by 1000
Work-study	Total work-study award: current year	Actual amount divided by 1000
Debt		
Debt threshold	Low debt: amount borrowed less than \$3000	0=no, 1=yes
Debt threshold	Medium debt: amount borrowed greater than \$3000 but less than \$7000	0=no, 1=yes
Debt threshold	High debt: amount borrowed greater than \$7000	0=no, 1=yes

TABLE 2
Descriptive Statistics in Percentages

	Private		Public	
	NPSAS:87	NPSAS:93	NPSAS:87	NPSAS:93
Background				
Male	46.7	42.9	47.6	45.9
African-American	7.7	10.4	8.4	9.7
Hispanic	4.5	7.4	4.7	6.0
White	82.6	74.9	81.9	77.3
Other	5.2	4.3	5.6	4.7
Under 22	68.1	60.0	59.3	55.2
Over 30	10.0	15.2	9.7	11.8
High income	20.0	5.4	3.1	17.9
Middle income	64.9	68.5	73.5	61.3
Low income	15.1	25.7	23.3	20.5
Dependent	80.5	66.9	76.8	64.8
Married	12.5	15.3	13.7	14.8
Disability	10.0	3.4	9.9	4.1
Mother has college degree	40.3	23.3	31.8	20.1
Father has college degree	41.7	33.7	32.6	31.5
High School				
GED	2.5	1.3	3.5	1.5
No degree	.5	.1	.9	.1
Aspiration				
Advanced degree	59.3	64.2	48.6	65.4
College degree	37.2	14.2	47.9	17.7
Some college	3.2	.7	3.1	1.0
College Experience				
Freshman	27.3	28.4	23.8	25.6
Sophomore	24.1	19.8	22.7	22.0
Junior	2.1	23.2	24.7	24.9
Senior	24.6	28.6	28.8	27.6
Reside on campus	51.2	43.6	30.3	25.0
Full-time	84.5	81.9	81.2	79.6
High GPA	9.6	18.9	7.4	12.3
Low GPA	4.5	19.9	8.8	21.4
No GPA	9.6	13.0	7.4	10.7
Remediation	12.9	6.7	17.5	10.3
Doctoral institution	48.1	20.4	56.1	46.0
Work full-time	13.5	27.0	12.1	25.3
Price & Subsidy				
Tuition	\$5,703	\$10,671	\$1,376	\$3,143
Current grants	\$2,227	\$3,668	\$726	\$1,155
Current year loans	\$1,173	\$2,309	\$590	\$1,353
Current work-study	\$181	\$313	\$77	\$118
Debt Variables				
Average debt	\$3,826	\$5,411	\$2,189	\$3,063
High debt	19.9	28.4	9.6	15.1
Middle debt	20.3	25.7	16.5	22.7
Low debt	17.3	15.4	21.4	20.5
No debt	42.6	30.5	52.5	41.8
Non-persisters	5.4	13.2	6.9	12.0

Significant at $p < .01$

Significant at $p < .05$

Private school students comprised the highest percentage of students with debt; 59.5% had accumulated debt, compared to 48.2% of public school students.

increased 43% and 57% respectively for private and public school students. We devised the three levels of debt by dividing the values for accumulated debt into three groups, an established method of coding for this type of model (Somers, 1992; Cofer & Somers, 1999). In addition, the percentage of students with no accumulated debt decreased between 1987 and 1993 for both private and public schools. Private school students comprised the highest percentage of students with debt; 59.5% had accumulated debt, compared to 48.2% of public school students.

Statistical Method

Statistical regression methods are used to describe the relationship between an outcome (dependent) variable and one or more explanatory (independent) variables. Regression techniques are used to find the "best fit" between explanatory variables and the outcome variable. In a linear regression model, two assumptions are important: that variables are continuous and that the relationship between an outcome variable and independent variables is expressed by a straight line. Both of these assumptions are violated when the outcome is dichotomous (Cabrera, 1994).

In models where the outcome variable is dichotomous (such as this study), the standard regression formula (Ordinary Least Squares method) can seriously misestimate the dependent variable, so researchers use the technique of logistic regression¹. Using this technique, a student chooses to persist or not, the outcomes are dichotomous: either "yes" or "no" (coded as 1 or 0). The resulting graph of the relationship is not a straight line, but a curved line bounded by zero and one. The value P also can be thought of as a probability measure that the outcome variable will be 1 (yes). This is precisely what a dichotomous model requires.

The beta coefficients are converted to delta-p's using a method recommended by Peterson (1984). The delta-p measures change in the dependent variable. For dichotomous variables, the delta-p provides a measure of the extent to which the outcome was likely to change if a student had the specified characteristic. For example, a delta-p of 0.050 for females is interpreted as increasing the probability of enrollment by 5.0 percentage points for this group.

With continuous variables, the delta-p is interpreted as meaning that a change in a unit measure will change the probability of the outcome by a certain percentage. For example, a

¹ The basic logistic regression equation is

$$P = E(Y|X) = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)}$$

$$1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)$$

Regardless of the values of the constants β_i or the variables X_i , the equation still results in values between zero and one because of the properties of the natural logarithm.

delta-p statistic of .0450 per \$1,000 of financial aid indicates that the probability of persistence increases by 4.5 percent per \$1,000 of financial aid awarded.

Results

Private School Students

The NPSAS:87 and the NPSAS:93 data for private school students have some similarities (Tables 3 and 4). In the 1987 survey, 10 of the non-financial variables were significantly associated with persistence. In the 1993 model, nine non-financial variables were significantly associated with persistence. Generally, the 1993 non-financial variables showed a larger effect size in every case where the variables were significant in both models. Seniors, high-income, and full-time students persisted at higher levels in both surveys. Only those students with low GPAs had a negative association with persistence in both surveys. For the financial variables, four were significant in 1987 and five were significant in 1993. For both years, grants and current-year loans were positively associated with persistence, while tuition was significant and negative. A high level of debt was significant and negatively associated with persistence both years, and medium-level debt was negative and significant in 1993.

NPSAS:87 Private School Students. Of the background variables, younger students—those under 22—were 1.46 percentage points more likely to persist than their older counterparts. High-income (income greater than \$60,000) students were 1.97 percentage points more likely to persist, and low-income (income less than \$11,000) students were 2.60 percentage points less likely to persist than middle-income (between \$11,000 and \$60,000) students. Seniors were 2.69 percentage points more likely to persist than freshmen. Full-time students and those who reside in on-campus facilities were 3.36 and 1.26 percentage points more likely to persist than part-time and non-residential students, respectively.

Students with a GPA in the lower third of the grade distribution, and those with missing GPAs, were 9.13 and 1.48 percentage points less likely to persist than students with an average GPA. Students with high GPAs were 1.63 more likely to persist. The finding for students with no GPA appears to indicate that many of the missing GPA scores were low. Students who worked full-time (more than 35 hours per week) were 2.8 percentage points less likely to persist.

As expected, rising tuition costs were negatively associated with persistence, with students being 1.60 percent less likely to persist per \$1,000 increase in tuition. However, private school students were 0.72 percent more likely to persist for every \$1,000 in grant received, and 1.01 percent more likely to persist for every \$1,000 of student loans received in the current year. High debt level (over \$7,000), was the only debt vari-

TABLE 3
Analysis of Within-Year Persistence for Private Students

	NPSAS:87 Delta-p	NPSAS:93 Delta-p
Background		
Male	-.0063	.0008
Black	-.0114	-.0030
Hispanic	-.0039	.0215
Other	.0028	.0135
Under 22	.0146	.0493
Over 30	.0038	.0037
High income (> \$60,000)	.0197	.0593
Low income (< \$11,000)	-.0260	.0202
Dependent	.0053	.0011
Married	.0012	-.0088
Disability	-.0127	-.0375
Mother has college degree	.0097	.0060
Father has college degree	.0078	.0228
Aspirations & Achievement		
Advanced degree	-.0005	.0746
College degree	-.0293	.0358
Some college	-.1303	-.0208
High School		
GED	-.0068	.0320
No high school	.0188	.0064
College Experience		
Sophomore	-.0039	.0201
Junior	-.0009	.0455
Senior	.0269	.0903
Live on campus	.0126	.0168
Full-time student	.0336	.0473
High GPA	.0163	.0030
Low GPA	-.0913	-.1237
No GPA	-.0148	.0092
Remedial	.0084	-.0249
Doctoral	-.0007	.0348
Work full-time	-.0280	-.0153
Price & Subsidies		
Tuition	-.0082	-.0038
Grant amount	.0072	.0122
Loan amount	.0101	.0105
Work-study amount	.0104	.0174
Debt		
High debt	-.0227	-.0679
Medium debt	-.0134	-.0433
Low debt	-.0144	-.0364
Model Statistics		
Sample size	10230	5557
Pseudo R	.0608	.0152
Chi-square	661.779	653.23
Persisters projected	99.89%	99.03%
Non-persisters projected	3.17%	9.14%
Overall predicted	94.81%	87.17%

Significant at $p < .01$

Significant at $p < .05$

able significantly associated with persistence. Students with high accumulated debt were 2.27 percent less likely to persist than those with no debt.

NPSAS:93 Private School Students. Only four of the background variables found to be significant in 1987 were significant in the 1993 model. Students under age 22 were 4.93 percentage points less likely to persist than those between 22 and 30. High-income students were 5.93 percentage points more likely to persist than middle-income students, and full-time students were 4.73 percentage points more likely to persist than part-time students. As in the 1987 survey, low GPA was significant and negatively associated with persistence (-12.37 percentage points). In each case, the effect size was larger than in 1987.

Not significant in 1993 were the low income, on-campus residency, missing GPA, high GPA, and working full-time variables. However, two aspiration variables, two college experience variables, and two debt variables were found to be significant in the NPSAS:93 model. Students who aspired to a bachelor's degree were 3.58 percentage points more likely to persist than those who aspired to less than a bachelor's degree. Students who aspired to an advanced degree were 7.46 percentage points more likely to persist than those students who planned on less education. As compared to first-year students, juniors were 4.55 percentage points more likely and seniors 9.03 percentage points more likely to persist than first-year students. Students at doctoral institutions were 3.48 percentage points more likely to persist than students not attending a doctoral institution.

Three of the four current-year price and subsidy variables were significant and associated with persistence. Students were 0.038 percent less likely to persist per \$1,000 of tuition cost, 1.22% more likely to persist per \$1,000 in grants received, and 1.05% more likely to persist per every \$1,000 in loans awarded for the current year. All of the accumulated debt variables were significant and negatively associated with persistence. Students with a low debt level (less than \$3,000) were 3.64 percentage points less likely to persist than those with no debt. Students with medium debt (between \$3,000 and \$7,000) were 4.33 percentage points less likely to persist, and students with high debt (over \$7,000) were 6.79 percentage points less likely to persist than students without accumulated debt.

Public School Students

With the exception of the variables for debt, there was a great deal of similarity in significance and effect in the other independent variables for public school students. Except for the debt variables, 13 of the same variables were significant in each model. These included two background, two aspiration, six college experience, and three price and subsidy variables.

For private school students, all of the accumulated debt variables were significant and negatively associated with persistence.

TABLE 4
Analysis of Within-Year Persistence for Public Students

	NPSAS:87 Delta-p	NPSAS:93 Delta-p
Background		
Male	-.0080	.0152
Black	-.0348	-.0195
Hispanic	-.0372	-.0251
Other	.0104	-.0079
Under 22	.0144	.0437
Over 30	.0142	.0099
High income (> \$60,000)	.0023	.0310
Low income (< \$11,000)	-.0245	-.0414
Dependent	.0109	-.0089
Married	-.0019	-.0191
Disability	-.0214	-.0164
Mother has college degree	-.0047	.0140
Father has college degree	.0213	.0013
Aspirations & Achievement		
Advanced degree	.0555	.0729
College degree	.0461	.0587
Some college	.0288	-.0080
High School		
GED	-.0088	.0079
No high school	.0219	-.1818
College Experience		
Sophomore	.0110	.0175
Junior	.0101	.0331
Senior	.0341	.0741
Live on campus	.0234	.0183
Full-time student	.0393	.0521
High GPA	-.0018	.0182
Low GPA	-.1190	-.1760
No GPA	-.0418	.0344
Remedial	.0179	.0126
Doctoral	.0053	.0049
Work full-time	-.0391	-.0262
Price & Subsidies		
Tuition	-.0159	-.0104
Grant amount	.0200	.0203
Loan amount	.0173	.0137
Work-study amount	.0219	.0296
Debt		
High debt	-.0056	-.0099
Medium debt	-.0292	-.0137
Low debt	-.0133	-.0421
Model Statistics		
Sample size	11218	11225
Pseudo R	.0705	.0933
Chi-square	850.417	1155.336
Persisters projected	99.67%	99.07%
Non-persisters projected	3.88%	6.96%
Overall predicted	93.07%	87.98%

Significant at $p < .01$

Significant at $p < .05$

For public school students, there were more similarities than differences in the comparison of NPSAS:87 and NPSAS:93.

NPSAS:87 Public School Students. Six of the background variables were significant in the NPSAS:87 public school student model. Ethnicity was an important variable in the 1987 model. African-American students and Hispanic students were 3.48 and 3.72 percentage points less likely to persist than white students. Students under age 22 (i.e., traditional-age college students) were 1.44 percentage points more likely to persist than students who were between 22 and 30. Low-income students and students with a self-reported disability were 2.45 and 2.14 percentage points less likely to persist than students with middle incomes and without a disability.

Two aspiration variables were significant. Students who aspired to a bachelor's degree were 4.61 percentage points more likely to persist than those who aspired to any postsecondary education less than a bachelor's degree. Students who aspired to some type of advanced degree were 5.55 percentage points more likely to persist.

Seven of the college experience variables were significantly associated with persistence. Seniors were 3.4 percentage points more likely to persist than first-year students, and students who lived on campus were 2.34 percentage points more likely to persist than those who lived off campus. A full-time student was 3.93 percentage points more likely to persist than a part-time student. Those students who received remedial course work were 1.79 percentage points more likely to persist than those who did not. Three college experience variables were negatively associated with persistence: students with a GPA in the lower third of the grade distribution, and students with no reported GPA were 11.90 and 4.18 percentage points, respectively, less likely to persist. Students who worked full-time were 3.91 percentage points less likely to persist.

Increases in tuition were, as expected, negatively associated with persistence. Public school students were 1.59% less likely to persist per \$1,000 increase in tuition. They were 2.00% more likely to persist for every \$1,000 in grant received and 1.73% more likely to persist for every \$1,000 of student loans received in the current year. Only one debt variable was significantly associated with persistence in the NPSAS:87 model: Students who had accumulated debt between \$3,000 and \$7,000 were 2.92% less likely to persist than students without debt.

NPSAS:93 Public School Students. There were more similarities than differences in the comparison of NPSAS:87 and NPSAS:93 for public school students. Male students were 1.52 percentage points more likely to persist than female students, and ethnicity was not a significant factor in the 1993 sample. Younger students were significantly more likely to persist by 4.37 percentage points over the 22- to 30-year-old cohort, a stronger association than in 1987. Low-income students were 4.14 percentage points less likely to persist than the middle-income

group. Unlike 1987, however, high-income students were 3.1 percentage points more likely to persist.

Similar to 1987, those students aspiring to graduate school and graduate degrees were 5.87 and 7.29 percentage points, respectively, more likely to persist than those who did not aspire to post-baccalaureate work. With the addition of sophomores, and the deletion of remedial students, the same college experience variables were significantly associated with persistence in NPSAS:93 and NPSAS:87. Sophomores, juniors, and seniors were all more likely to persist than freshmen, by 1.75, 3.31, and 7.41 percentage points, respectively. Full-time and residential students were significantly more likely to persist in the 1993 sample. Low achievers were 17.6 percentage points less likely to persist than students with average GPAs, as compared to 1987. However, students who did not report a GPA were 3.44 percentage points more likely to persist than in 1987.

All of the price and subsidy variables were significant in the 1993 model. Tuition was less of factor in 1993 than it was in 1987, with every \$1,000 increase in tuition decreasing the chances of persistence by 1.04%. Public school students were 2.03% more likely to persist for every \$1,000 in grant received, and 1.37% more likely to persist for every \$1,000 of student loans received in the current year. Work-study had a significant effect on persistence in 1993; for every \$1,000 in work-study aid received, a student was 2.96% more likely to persist.

Only one debt variable was significantly associated with persistence in the NPSAS:93 model, and it was different from the single significant variable in 1987 for public school students. Those students with a low level of debt (less than \$3,000) were 4.21% less likely to persist than those with no debt.

Analysis

Non-Financial Variables

Background, aspiration, high school, and college experience variables exhibit both differences and similarities between the public and private school students. Age, income, class level, a low grade point average, and being a full-time student were all significant for public and private students across both surveys. Ethnicity, gender, disability, living on campus, working full-time, aspirations, and remediation tended to drop in and out of the analysis depending on type of student and timing of the survey.

For public school students in 1987, ethnicity, high income, disability, father's educational level, aspirations, and remediation were significant and associated with persistence; none of these variables was significant for private school students. Correspondingly, only private school students in 1987 were significantly affected by a high level of income. In 1993, only public school students were influenced by gender, a low level of income, being a sophomore, living on campus, and working full-time. For the same time period, private school students were significantly affected by attending a doctoral institution.

The shift from grants to loans, a strategy designed to assist middle- and upper-class families, appears to have backfired.

Across the surveys, however, public school students appear to have become slightly more homogenous. While gender was significant in the 1993 survey, ethnicity was not significant in the latter survey. Being a sophomore or junior at a public university was not significantly associated with persistence in 1987, but was positively and significantly associated with persistence in 1993. Two variables fell from significance in 1993: students with disabilities and students who had received remediation.

While there were changes in persistence at the public and private institutions from 1987 to 1993, the changes were not parallel. The increase in diversity between 1987 and 1993 in the private schools yielded interesting results. Aspirations were significant and positive in relation to persistence in 1993, and low income was no longer significant. Matriculation in a private doctoral institution was significantly associated with persistence in 1993 and not in 1987, as was junior level class level.

Can these differences be attributed to the changing demographic patterns of public and private school enrollments between 1987 and 1993? Probably, but this analysis does not help us make that conclusion. The results indicate a need to evaluate the sociological and economic changes in public and private school enrollment, clearly outside the scope of this study.

Financial Variables

The findings of the price and subsidy variables were consistent with the findings of other persistence studies (Andrieu & St. John, 1993; Cofer & Somers, 1997, 1999; Perna, 1996; St. John, 1991a, 1992, 1994; St. John & Andrieu, 1995; St. John et al., 1992; St. John & Starkey, 1995a, 1995b; Starkey, 1993; Trammell, 1994). The tuition amount was, in every case, negatively associated with persistence. The magnitude of the effect of tuition, however, was smaller for private school students, and smaller in 1993 than 1987 for both public and private school students.

Subsidy variables for current-year grants and loans were all positively and significantly related to persistence for both private and public school students across both surveys. Generally the magnitude of the effect of subsidies on persistence was greater in 1993 than 1987 for both types of students. The only exception was current-year loans, which were less of a factor in 1993, based on effect size, for public school students. Work-study awards were only significant in 1993.

The debt variables produced the most interesting picture of all the variables in the analysis. For public school students, debtload was not as important in the persistence/withdrawal decision as other non-financial and financial variables. In 1987, only those students with debt between \$3,000 and \$7,000 did not persist so well as those with no debt, and in 1993 persis-

tence was affected significantly for only students with low debt levels. Private school student behavior was quite different between 1987 and 1993. In 1987, persistence was affected only for private students with accumulated debt above \$7,000. By 1993, all levels of debt were significant and negatively associated with persistence for private school students.

We believe that the results for private college students in 1993 are more indicative of the decision-making process for within-year persistence decisions than the 1987 data. That is, the effect is felt in "lump sums" (Cofer & Somers, 1997, 1999), at the beginning of each semester as well as each academic year. A student borrows a specific amount (lump sum) at the beginning of each semester. When the next semester rolls around, the student has to again make a decision to persist, in part, on this new, higher level of debt. Students view this decision as intimidating, especially as they move from one perceived level of debt to a perceived milestone or "point of no return."

Conclusions

This study assists in the development of a theory of the influence of price, subsidy, and debtload over time. Student response to loans, amounts of subsidies, and net cost of college attendance all changed in the years between NPSAS:87 and NPSAS:93. Our assumption is that political forces changed the financial aid paradigm indelibly.

The amount of debt carried by private college students and their families has a significant and negative impact on within-year persistence. In the short term, particularly the current academic year, both public and private school students are willing to borrow to attend college, and at an increasing rate. This current-year borrowing to finance tuition appears to have decreased the influence tuition increases have on persistence decisions. However, in the case of private school students, the accumulated effect of yearly borrowing decreases the likelihood of continued enrollment.

The student body in 1992 was substantially different from that of 1986, and federal financial aid policy has shifted more to benefit middle-income students, through the more extensive use of loans rather than grants. The reaction of students as manifest in NPSAS:93, appears to be quite different from NPSAS:87. The acceptance of the policy shift from grants to loans appears to have been delayed, along with the acceptance of debt by college students and their families.

Finally, the shift from grants to loans, a strategy designed to assist middle- and upper-class families, appears to have backfired. Students at low-cost public schools have the same opportunity to borrow as private school students; the difference is a lower cost and, therefore, generally lower need. The statistics on average accumulated debt reflect this conclusion. Students at high-cost private institutions now pay more and borrow more,

and the easy availability of loans impacts their persistence decisions.

Why the changes from 1987 to 1993? How have the financial aid policy changes contributed to the differences between public and private school students? Based on these results, what will be the effects of the changes to federal financial aid policy since these data were collected?

The original HEA legislation, assisting needy students through grants and subsidized loans, was powerfully shaped by the "needs" ideology. The 1972 amendments broadened the policy objectives to access and choice, and established the foundational role of the federal government in student aid. "Access and choice" defines the public school and private school dichotomy. Public schools offer low tuition and little institutional-based aid, with the exception of those states that have adopted a high-tuition, high-aid strategy (St. John, 1991b). Low tuition implies that most of the aid at public schools will go to low-income students, since middle- and high-income students will have no need. Therefore, federal student aid acts to supplement the low-tuition strategy of public institutions, and to promote access. Private institutions, in general, spend a large portion of their resources on student aid through tuition discounting. Therefore, federal student aid "federalizes" some of the costs of student aid that these institutions would incur in the natural course of business.

The results of this study underscore the concern over student debtload. The amount of debt held by private college students and their families had a significant and negative impact on within-year persistence. In the short term, both public and private school students were willing to borrow to attend college, and at an increasing rate. This current-year borrowing to finance tuition appears to have diminished the influence tuition increases had on persistence decisions. In the case of private school students, the long-term effect of short-term borrowing decreased the likelihood of continued enrollment. With the increased borrowing limits of the 1992 HEA reauthorization, the dependence on debt to finance a student's higher education is troublesome. Additional research, especially using NPSAS:96 and 2000, should further illuminate the relationship between debtload and student persistence decisions.

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